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SECTION 1

PURPOSE OF AND NEED FOR PROPOSED ACTION

Section 1 describes the purpose of and need for improvements being considered in the WIS 83 corridor in Waukesha County. Purpose and need factors encompass existing transportation, land use and environmental conditions in the corridor as well as changes that may occur later during the project's 20-year planning period.

PROPOSED ACTION

The Wisconsin Department of Transportation (WisDOT) in consultation with the Federal Highway Administration (FHWA), is studying alternatives for improving traffic flow, capacity, and safety on WIS 83 in Waukesha County. The proposed improvements will address long-term transportation demand identified in the Southeastern Wisconsin Regional Planning Commission's (SEWRPC) *2020 Regional Transportation System Plan* and the *Development Plan for Waukesha County*.

PURPOSE AND NEED

The purpose of the proposed action is to provide a safe and efficient transportation system in the WIS 83 corridor to serve present and long-term traffic demand while minimizing disturbance to the natural and built environment. WIS 83 serves adjacent development and local traffic in and between the communities of Mukwonago, Genesee, Genesee Depot, Wales, Delafield, and Hartland. It also provides a regional connection between I-43 at Mukwonago, I-94 at Delafield, and WIS 16 at Hartland.

The purpose of the proposed transportation improvements includes the following objectives that will be described in detail later in this section:

Address traffic demand—Present Annual Average Daily Traffic (AADT) volumes on most of the WIS 83 corridor are above the threshold volume that can be handled safely and at an acceptable operational service level. If development continues to grow as projected along the project corridor and in the region it serves, there will be a corresponding increase in traffic demand on WIS 83.

Address existing highway deficiencies—The existing highway has several sharp curves and steep hills that limit stopping sight distance and visibility at driveways and side roads. Many of the side road intersections are angled or connect to WIS 83 at curves, and the roadway shoulders are too narrow. In several areas there are no turn lanes at side road intersections, or where turn lanes are present, they are too narrow and short.

Access management—The existing highway is not designed to handle the high number of turning movements that occur along the corridor. Conflicts between through and local traffic generated by numerous driveways and side roads adversely affects safe and efficient access to adjacent development and community facilities.

Address safety concerns—Nearly the entire WIS 83 corridor has crash rates that exceed statewide average rates for similar highways. This situation will worsen as traffic volumes increase.

Preserve environmental resources— The WIS 83 corridor has numerous natural resources, historic structures, rural community characteristics, aesthetic features, and multi-use recreation trails that should be preserved and enhanced to the extent possible and practical.

Enhance local planning— A recommended transportation improvement plan for WIS 83 will provide a “blueprint” that can be used by local governments in making future land use and development decisions and to preserve land for future transportation improvements.

The need for transportation improvements on WIS 83 is demonstrated through a combination of factors including regional and local transportation and land use planning, system linkage and route importance, present and future traffic, geometric and operational deficiencies on the existing highway, safety concerns, and corridor preservation. The remainder of Section 1 discusses these factors. The purpose of and need for the proposed improvements sets the stage for developing and evaluating possible improvement alternatives.

Transportation and Land Use Planning

The Southeastern Wisconsin Regional Planning Commission (SEWRPC) conducts land use and transportation planning for a seven-county region including Waukesha County. Planning is guided by technical coordinating and advisory committees with representatives from state and federal agencies; the university community; local government planning, transportation, and public works departments; transit providers and service groups; and environmental organizations. Public input is sought through newsletters, information meetings and hearings, and distribution of informational materials.

Regional Land Use Plan

The adopted *2020 Regional Land Use Plan*¹ was designed for an *intermediate* growth scenario in the region including Waukesha County. Key recommendations in the regional land use plan include the following:

- Emphasis should be on medium-density development in planned urban service areas, and new low-density and suburban-density residential development beyond planned urban service areas should be minimized.
- Infill and brownfield development is encouraged to facilitate a compact, centralized urban land use pattern.
- Open space uses such as environmental corridors and isolated natural areas should be preserved to maintain the overall quality of the environment, preserve natural habitats, and provide opportunities for recreational and educational activities. Where recreational, transportation, or utility development is proposed within environmentally sensitive areas, design and construction should cause the least possible disturbance.
- Continued farming in areas with prime agricultural lands should be encouraged, and where agricultural land is converted to residential use, this should be limited to rural-density development with no more than one dwelling unit per 5 acres (2 ha).

¹ The 2020 Regional Land Use Plan for Southeastern Wisconsin (SEWRPC Planning Report Number 45, December 1997) and information about the regional land use planning process are available from SEWRPC, 916 N. East Avenue, Box 1607, Waukesha, WI 53187-1607.

Growth projections for Waukesha County based on an intermediate growth scenario are presented in Table 1-1.

TABLE 1-1
Intermediate Growth Projections for Waukesha County

Growth Factor	Percent Increase 1990-2020
Population	28
Households	42
Employment	40
Urban Land Use	21
Commercial Land Use	43
Residential Land Use	25
Vehicle Miles Traveled	65
Adapted from the 2020 Regional Land Use Plan	

Proposed land use along the WIS 83 corridor in Waukesha County according to the regional land use plan is illustrated in Exhibit 1-1. The majority of the corridor is envisioned as having a mix of low to medium density and suburban residential development as well as maintaining large tracts of open space, farmland, rural density residential development, and primary environmental corridors.

Regional Transportation System Plan

Based on population, household, employment growth and other data from the regional land use plan, the 2020 Regional Transportation System Plan² forecasts traffic growth and transportation demand in the region as well as providing an analysis of existing transportation facilities. Future traffic demand is determined through SEWRPC's regional traffic model that has been in place for 35 years and is updated regularly to reflect changing trends. Traffic forecasts reflect predicted growth patterns, number and types of trips made, routes taken, travel times, and other factors such as transit use. In its recommendations for providing additional capacity on highways like WIS 83, the regional plan assumes the following:

- Intermediate growth scenario for the region, and community land use planning that promotes compact development/redevelopment in areas that can use existing or expanded municipal sewer and water, and where higher density development can be served by transit, bicycle, and pedestrian facilities.
- Greatly expanded mass transit including development of rapid and express transit systems and substantial expansion of local bus systems throughout the region where development density is sufficient to generate ridership and use of such services.
- Maximum investment in ways to reduce auto travel and make existing facilities more efficient before commitments are made to increase highway capacity.

² The 2020 Regional Transportation Plan for Southeastern Wisconsin (SEWRPC Planning Report Number 46, December 1997) and information about the regional planning transportation planning process is available from SEWRPC at the address listed in footnote 1.

- Maximum investment in improving traffic flow and safety on highways and arterial streets through measures such as intersection improvements and access management, before commitments are made to increase highway capacity.

The regional transportation system plan also recommends transportation improvements that should be carried out over a period of time by governmental jurisdictions based on their estimation of priority needs and available funding. While the plan does not specify a particular roadway typical section, it does recommend the number of traffic-carrying lanes needed on the transportation system to address future traffic demand.

Recommended transportation improvements in Waukesha County through the 2020 planning period are shown on the map in Exhibit 1-2 adapted from the regional plan. Recommendations for the WIS 83 corridor are as follows:

- Provide additional capacity (4-lane facility) from Mukwonago near County NN to WIS 59
- No additional capacity needed from WIS 59 to County DE/E

For purposes of the WIS 83 Corridor Study, this gap has been refined to also include the portion of WIS 83 between County X and WIS 59 because forecast traffic volumes for Design Year 2026 do not indicate the need for additional capacity in this segment.

- Provide additional capacity (4-lane facility) from County DE/E to WIS 16

Transportation Improvement Program (TIP)

SEWRPC is the designated federal Metropolitan Planning Organization (MPO) for ensuring air quality conformity in southeastern Wisconsin. Six of the counties, including Waukesha County, are considered non-attainment for ozone standards. Under the 1990 Clean Air Act Amendments, proposed highway improvements involving capacity expansion must be included in an approved Transportation Improvement Program (TIP) as well as the adopted regional transportation system plan to be in conformance with the State Implementation Plan for air quality (SIP).

The *Transportation Improvement Program for Southeastern Wisconsin: 2002-2004* (SEWRPC, February, 2002) includes the following entries for the WIS 83 corridor (listed from south to north):

- Project #502: Reconstruction with no additional lanes from County NN to WIS 59
- Project #501: Resurface from WIS 59 to Genesee Depot and from County D to County DE
- Project #514: Reconstruct with additional lanes from US 18 to I-94
- Project #512: Reconstruction with additional lanes from Mariner Drive (near I-94) to WIS 16

Project #502 and Project #501 are interim Highway Preservation (HP) improvements intended to preserve the functionality of the existing roadway until capacity improvements are made at some point in the future as recommended in the Regional Transportation System Plan.

To provide flexibility in the range of alternatives being considered in the WIS 83 Corridor Study, the 2002-2004 TIP was amended on March 28, 2003 to include the corridor study from the Village of Mukwonago to STH 16 (TIP Project #856).

Waukesha County Development Plan

Prior to the 2020 *Regional Transportation System Plan*, Waukesha County in consultation with SEWRPC, conducted a comprehensive “growth management” planning effort to guide the county and its municipalities in joint decision-making regarding future development. The *Development Plan for Waukesha County* (SEWRPC Community Assistance Planning Report 209, August, 1996) provides guidance for orderly economic development and preservation of environmental resources. The plan notes that urban land use in the county increased by about 87 percent between 1963 and 1990, that about 52 percent of the urban land use occurred within planned urban services areas, and that the balance, 48 percent, occurred outside planned service areas. The plan envisions that urban land use will increase in the future by about 72 percent under “buildout” conditions (full development of areas proposed for urban land uses). In its transportation recommendations, the Waukesha County development plan noted that the WIS 83 corridor would need to be a 4-lane facility in its entirety to accommodate future buildout development.

System Linkage and Route Importance

WIS 83 is an arterial highway linking the smaller communities along the corridor to each other and providing connections to regional destinations outside the corridor (see Exhibit 1-3). WIS 83 is functionally classified³ as a “minor arterial” intended to provide moderate through traffic mobility and to funnel traffic from local roads and traffic generators to higher-type highways such as principal arterials and freeways. WIS 83 is not part of the National Highway System and is not a federal long-truck route. As a north-south arterial highway, WIS 83 serves as the main stem for a network of east-west roadways that collect and distribute traffic in the area between WIS 67 to the west and WIS 164 to the east. Table 1-2 lists the primary highways that comprise the roadway network in the WIS 83 corridor.

³ Highways are classified according to the character of service they provide and their relationship to abutting land use. Classifications range from a high degree of travel mobility to land access functions. For rural highways, principal arterials serve corridor movements having trip length and travel density characteristics of an interstate or inter-regional nature. Minor arterials provide moderate through traffic mobility and are intra-regional in nature. Collectors and local roads primarily serve area traffic generators and provide links between smaller communities. Source: *WisDOT Facilities Development Manual*.

TABLE 1-2
Transportation System Network in WIS 83 Corridor

Highway	Functional Classification	Regional Connections from WIS 83 Corridor
I-43*	Freeway	Links WIS 83 to Milwaukee urbanized area and the Beloit-Rockford urbanized area.
County I	Minor Collector	Links WIS 83 to areas west and south of Mukwonago and to Waukesha via WIS 164
County X	Minor Collector	Links WIS 83 to Waukesha via WIS 59
WIS 59	Principal Arterial	Links WIS 83 to Waukesha, I-94 and areas east of Waukesha via the Waukesha bypass; links WIS 83 to the Whitewater area
County DE/E	Minor Collector	Links WIS 83 to the Waukesha area and to areas north and west of Mukwonago
US 18	Principal Arterial	Links WIS 83 to Waukesha, Brookfield, and Milwaukee area; links WIS 83 to the Oconomowoc area via WIS 67; links WIS 83 to the Jefferson and Cambridge areas
I-94	Freeway	Links WIS 83 to the Waukesha-Milwaukee urbanized area and the Oconomowoc area to Madison urbanized area
County KE	Minor Collector	Links WIS 83 to the Village of Hartland and surrounding development in the area between I-94 and WIS 16
WIS 16	Freeway	Links WIS 83 to the Pewaukee and Oconomowoc areas
*I-43 is not in the corridor study area, but it is an important connection south of the project terminus.		

WIS 83 is an “access management” corridor under WisDOT’s *Statewide Access Management Plan*, adopted in 1989. The plan is a guideline for maintaining high mobility for through traffic while providing reasonable local road and property access. Access management is intended to enhance and preserve traffic flow and carrying capacity, and to improve safety on rural highways and those transitioning from rural to urban/suburban service characteristics. Key objectives include:

- Separating turning vehicles from through traffic by providing turn lanes and bypass lanes.
- Limiting the number of direct access points through shared driveways, restricting the number of driveways for existing residential or commercial parcels, implementing driveway spacing guidelines, and providing access from a local cross road where possible.
- Consolidating commercial and residential subdivision parking lots, and providing shared driveways where possible.

Traffic Data

Existing and Future Traffic Volumes

For purposes of the WIS 83 corridor study, traffic volumes are expressed as Annual Average Daily Traffic (AADT) volumes that reflect average travel conditions on a particular highway rather than daily or seasonal fluctuations. Existing traffic volumes were derived from WisDOT’s year 2000 automatic count data. Forecast volumes, developed by WisDOT’s Bureau of State Highway Programs in Madison, were derived from historic counts and are consistent with SEWRPC’s forecasts that reflect existing and future land use and development trends.

Traffic forecasts cover a planning period through Design Year 2026. Intermediate forecasts for 2006 (earliest possible construction year) and 2016 (10 years after construction) are also provided to show how traffic is expected to increase within the planning period. Traffic volumes are summarized in Table 1-3 and on the traffic map in Exhibit 1-4. Future traffic volumes are for a no build scenario (existing highway dimensions with projected traffic increases over time). A Build Alternative that would add roadway capacity would likely attract some additional through traffic to the WIS 83 corridor. While it isn't possible to estimate with any degree of certainty what that increase might be over the no build volumes, the effect of any attracted traffic is not expected to be substantial.

TABLE 1-3
Existing and Future Traffic
(Average for roadway segments)

Roadway Segment And Type¹	Existing Traffic (2000)	Future Traffic (2006)	Future Traffic (2016)	Future Traffic (2026)	Percent Increase (2000-2026)
County NN to County X (Rural transitioning to suburban)	9,600	10,700	13,000	15,700	63
County X to County DE/E (Rural/suburban transitioning to suburban/urban)	6,900	7,700	9,300	11,300	64
County DE/E to Hillside Drive (Urban/Suburban)	16,100	17,900	21,300	25,300	57
Hillside Drive to County DR/Golf Road (Urban)	23,200	25,700	30,400	36,000	55
County DR/Golf Road to Meadow Lane (Suburban)	17,200	19,000	22,300	26,300	53
Meadow Lane to WIS 16 (Suburban)	14,300	16,000	19,300	23,300	63
WIS 16 to Chapel Ridge Road (Suburban)	8,300	9,300	11,200	13,500	63
Notes: 1. Roadway type is based on predominant land use characteristics adjacent to the existing highway.					

As noted in Table 1-3, traffic along the WIS 83 corridor is expected to increase between 53 and 64 percent by Design Year 2026. Roadway design guidelines (WisDOT's *Facilities Development Manual* and the *Highway Capacity Manual, HCM2000, Transportation Research Board* computer analysis⁴) indicate 13,800 AADT as the threshold volume that can be safely handled at an acceptable service level on a 2-lane rural/suburban highway that is not a Corridors 2020 route⁵. Traffic in the 2-lane rural segments in the northern half of the corridor (County DE/E to WIS 16) already exceeds this threshold volume. In 2026 all but two segments (County X to County DE/E and WIS 16 to Chapel Ridge Road) are projected to exceed the threshold.

The 4-lane urban segment from Hillside Drive to County DR/Golf Road presently carries about 23,200 AADT and is below the 28,000 AADT threshold volume (WisDOT's *Facilities Development Manual* and the *Highway Capacity Manual, HCM2000, Transportation Research Board* computer analysis) that can be safely handled at an acceptable service level on an urban 4-lane highway. Traffic in this segment is expected to exceed the 28,000 AADT threshold by 2026.

Truck Traffic

Approximately 6 percent of the total traffic on WIS 83 is comprised of trucks. Trucks include heavy single units with 2 axles and 6 tires or 3 axles, tractor-semitrailers with 3 or more axles, and double bottom semis with 5 or more axles. Under today's traffic volumes, the number of trucks that use the corridor on an average weekday ranges from 420 in the lowest volume segment to 1,400 in the highest volume segment. In 2026, daily truck traffic is expected to remain at approximately 6 percent of the total traffic and range from 700 to 2,200.

The number of trucks in the traffic stream affects traffic operations and safety, and contributes to the level of congestion. Trucks take more time to change lanes and turn at intersections, occupy more roadway space, require more turning room, and consequently have a greater effect on traffic flow than passenger vehicles. On 2-lane highways the overall effect of one truck on traffic operations is often equivalent to as many as 5 passenger cars (*Highway Capacity Manual, HCM2000, Transportation Research Board*).

Local and Regional Traffic Mix

A travel survey using a license plate video technique was conducted on an average weekday in spring 2002 for northbound traffic from north of County NN to north of US 18. Average weekdays are defined as non-holiday Tuesdays, Wednesdays, or Thursdays. The purpose of the survey was to classify the types of trips being made in the WIS 83 corridor and to determine the traffic split by trip length.

The results of the survey indicate that of the total vehicle trips, 72 percent are classified as short trips (less than 3 miles (4.8 km)), 18 percent are classified as medium trips (3 to 6 miles (4.8 to 9.7 km)), and 10 percent are classified as long trips (greater than 6 miles (9.7 km)). Of the total truck trips, 68 percent are classified as short trips, 16 percent medium trips, and 16 percent long trips.

⁴ 13,800 AADT is a composite value for the various 2-lane segments in the corridor. See "Highway Capacity/Operations" for an explanation of level of service.

⁵ WisDOT's *Corridors 2020 Plan* was developed to provide a network of high quality highways that link and serve the state's major economic and tourism centers. The WIS 83 corridor is not included in the plan.

The results of the travel survey support the traffic reduction in the WIS 83 segment between County X and County DE/E. Other factors influencing the traffic reduction include the location of this WIS 83 segment (midway between two freeways, I-43 and I-94); County X provides a direct route from Mukwonago to Waukesha; County E provides a direct route to the developing areas of North Prairie and Eagle; and WIS 59, County D, and County DE/E provide east-west routes.

Highway Capacity/Operations

Level of Service (LOS) measures a highway's ability to handle traffic demand. LOS is affected by factors such as AADT volumes, peak-hour volumes, truck percentages, number of driving lanes, lane widths, vertical grades, passing opportunities, presence or absence of traffic signals, and access type/spacing. The Transportation Research Board in its *Highway Capacity Manual, HCM2000* has established guidelines for the appropriate LOS on various types of highways. Service levels range from "A" to "F" in order of decreasing operational quality. In addition to the traditional alpha scale (A to F), WisDOT uses a numeric scale to provide a more detailed comparison between highway segments and as a method for comparing segment values to threshold values. The LOS values are provided in Table 1-4.

TABLE 1-4
Level of Service Values

Level of Service (Alpha Values)	Level of Service (Numeric Values)
A Unrestricted free flow Drivers virtually unaffected by others High level of freedom to select speed and maneuver Excellent level of driver comfort and convenience	1.01 to 2.00
B Slightly restricted stable flow Driver aware of use by others Slight restriction in speed and maneuvering Very good level of driver comfort and convenience	2.01 to 3.00
C Minimal congestion Driver operation affected by others Minor restriction in speed and maneuvering Good level of comfort and convenience	3.01 to 4.00
D Moderate congestion Driver operation completely affected by others Moderate restriction in speed and maneuvering Fair level of driver comfort and convenience	4.01 to 5.00
E Severe congestion Slow speeds and traffic backups; some stoppage Total restriction in vehicle maneuvering High driver frustration	5.01 to 6.00
F Extreme congestion Stop and go movements with long backups and delays Forced vehicle maneuvers Maximum driver frustration	6.01 and higher

According to WisDOT's *Facilities Development Manual*, the numeric thresholds are intended to balance the social, environmental and monetary costs of using the traditional performance threshold of LOS "C" against the costs of accepting more congestion on some portions of the State Trunk Highway system before improvements are considered. For minor arterials like WIS 83 that are not part of the Corridors 2020 network, WisDOT considers a value of 5.0 (LOS "D"), which allows moderate congestion, to be an acceptable threshold.

Using traffic forecasts for an intermediate growth scenario, capacity analyses were completed for the WIS 83 roadway mainline during morning peak (7 to 8 A.M.) and evening peak (5 to 6 P.M.) traffic conditions to determine the existing and Design Year 2026 LOS if no improvements are made. The results are presented in Table 1-5.

TABLE 1-5
Roadway Mainline Level of Service (LOS)

Roadway Segment	Time Period	Existing LOS	Design Year (2026) LOS
County NN to County X	AM peak	D	D
	PM peak	D	E
County X to County DE/E	AM peak	C	D
	PM peak	C	D
County DE/E to Hillside Drive	AM peak	D	E
	PM peak	E	F
Hillside Drive to County DR/Golf Road	AM peak	C	D
	PM peak	D	E
County DR/Golf Road to Meadow Lane	AM peak	A	B
	PM peak	B	C
Meadow Lane to WIS 16	AM peak	D	E
	PM peak	E	F
WIS 16 to Chapel Ridge Road	AM peak	C	D
	PM peak	D	D

Under today's traffic, two of the segments along the WIS 83 corridor are operating below the LOS "D" threshold for considering improvements to address congestion, County DE/E to Hillside Drive and Meadow Lane to WIS 16. In 2026, four segments would be operating below the LOS "D" threshold:

- County NN to County X
- County DE/E to Hillside Drive
- Hillside Drive to County DR/Golf Road
- Meadow Lane to WIS 16

A capacity analysis was also completed for the highest volume signalized intersections in the WIS 83 corridor. According to the HCM2000, level of service criteria for signalized intersections as summarized below, are based on stopped delay per vehicle.

LOS A	Less than 10 seconds stopped delay
LOS B	10 or more but less than 20 seconds stopped delay
LOS C	20 or more but less than 35 seconds stopped delay
LOS D	35 or more but less than 55 seconds stopped delay
LOS E	55 or more but less than 80 seconds stopped delay
LOS F	80 or more seconds stopped delay

Delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Table 1-6 presents the results of the WIS 83 intersection LOS analysis for morning and evening peak periods under existing and Design Year traffic conditions.

TABLE 1-6
Intersection Level of Service

Intersection	Time Period	Level of Service (LOS)	
		Existing (2000)	Design Year (2026)
WIS 59	AM peak	B	F
	PM peak	B	E
County DE/E	AM peak	C	F
	PM peak	C	F
US 18	AM peak	B	F
	PM peak	C	F
County DR/Golf Road	AM peak	C	F
	PM peak	C	F
County KE/Oakwood Road	AM peak	B	F
	PM peak	B	F
Cardinal Lane	AM peak	B	F
	PM peak	F	F

Under present traffic conditions, all of the major signalized intersections are operating at an acceptable LOS except the Cardinal Lane intersection that is below the LOS “D” threshold. The low level of service at Cardinal Lane is due to the heavy westbound left turn volume during the evening peak period. Increased user delays can be expected in 2026 for all the intersections if no improvements are made. The HCM2000 computer model for intersections allows a greater number of inputs compared to the model for roadway mainline segments. The intersection model is therefore more sensitive to input parameters such as number of lanes, left and right turn vehicle storage, and signal timing and progression resulting in a greater incremental change in level of service from year 2000 to year 2026.

Currently, there are traffic signals at WIS 59, County DE/E, US 18, Hillside Drive, Heritage Drive, both I-94 ramps, County DR/Golf Road, County KE/Oakwood Road, and Cardinal Lane. Future traffic signals at County I, County X, County D, Criglas Road, Capitol Drive, and the WIS 16 ramps may be warranted by year 2026.

Existing Highway Characteristics

Most of the WIS 83 corridor consists of a 2-lane rural roadway as shown in Exhibit 2-1. There are 4-lane divided segments north and south of the I-94 interchange area. There is an at-grade crossing of the Wisconsin Southern (WS) Railroad in Genesee Depot. The Glacial Drumlin State Trail passes under WIS 83 about 1,000 feet (305 meters) south of US 18 in Wales, the Lake Country Recreation Trail has an at-grade crossing about 700 feet (213 meters) north of County DR/Golf Road in Delafield, and the Ice Age Trail has an at-grade crossing at Mariner Drive. The following discussion provides information on existing highway characteristics relevant to project purpose and need.

Roadway Dimensions

Existing roadway dimensions are summarized in Table 1-7 and illustrated with photos in Exhibit 1-5. The typical driving lane width throughout the corridor is 12 feet (3.6 meters) and the shoulder width varies from 1 foot (0.3 meter) to 10 feet (3 meters). The total roadway right-of-way varies from 50 feet (15 meters) to 570 feet (174 meters).

TABLE 1-7
Existing Roadway Dimensions

Roadway Segment	Roadway Type	Driving Lanes Feet (meters)	Shoulders Feet (meters)	Total Right-of-Way Feet (meters)
County NN to WIS 59	2-lane	12 (3.6)	1-5 (0.3-1.5) ¹	66-100 (20-31)
WIS 59 to US 18	2-lane	12 (3.6)	6 (1.8)	50-160 (15-49)
US 18 to Hillside Drive	2-lane	12 (3.6)	10 (3)	120-570 (37-174)
Hillside Drive to I-94	4-lane divided	12 (3.6)	1-2 (0.3-0.6)	220-260 (67-79)
I-94 to County DR/Golf Road	4-lane divided	12 (3.6)	8 (2.4)	220-300 (67-91)
County DR/Golf Road to Meadow Lane	4-lane divided	12 (3.6)	10 (3)	120-300 (37-91)
Meadow Lane to Capitol Drive	2-lane	12 (3.6)	8 (2.4)	90-350 (27-107)
Capitol Drive to WIS 16	2-lane	12 (3.6)	10 (3)	225-270 (69-82)
WIS 16 to Chapel Ridge Road	2-lane	12 (3.6)	6 (1.8)	66-225 (20-69)
Notes: 1. North of Holiday Road there is an approximate 300-foot (91-meter) segment that has a 1-foot (0.3-meter) shoulder.				

Safety clear zones provide a traversable recovery area beyond the edge of the pavement for drivers who veer of the highway. The design standard clear zone width ranges from 4 feet (1.2 meters) in lower speed urban areas, 20 feet (6 meters) in suburban areas, to 30 feet (9 meters) in high-speed rural areas. Existing clear zone widths range from 3 feet (1 meter) in urban areas to 12 feet (4 meters) in suburban areas and 15 feet (5 meters) in rural areas.

Horizontal and Vertical Roadway Alignment

Evaluating the adequacy of a roadway's horizontal alignment depends on its design speed⁶ and other parameters used to determine the maximum degree of curvature allowed under WisDOT's roadway design standards. Design speeds vary throughout the corridor. A 50 to 60 mph (80 to 100 km/h) design speed was used to evaluate existing roadway geometry on rural segments and a 30 to 40 mph (50 to 65 km/h) design speed was used on urban/suburban segments.

Information on horizontal curves along the WIS 83 corridor is provided in Table 1-8. Degree of curve indicates how sharp a particular curve is compared to current design standards (lower numbers indicate flatter curves and higher numbers indicate sharper curves). As shown in the table, there are 11 locations along the WIS 83 corridor where horizontal curves do not meet current design standards.

- There are 3 curves posted at 45 mph (70 km/h) and marked with curve warning signs in the County X to Walnut Street segment.
- There are 2 substandard curves in the Walnut Street to County D segment, one in "Genesee Village" and one in Genesee Depot where WIS 83 makes a right-angle turn
- There are 3 substandard curves in the County D to County DE/E segment
- There are 3 substandard curves in the WIS 16 to Chapel Ridge Road segment

⁶ Design speed is the maximum speed that can be maintained over a specified highway section when conditions are so favorable that the design features of the highway govern. It is affected by factors such as highway type, topography, adjacent land use, and driver expectations. To account for a wide range of actual vehicle running speeds, the posted speed is typically set at 5 mph (8 km/h) lower than the design speed.

TABLE 1-8
Horizontal Curves

Roadway Segment	Design Speed	Travel Speed Existing Curve Can Accommodate	Degree of Curve (deg-min)		Adequate Yes or No
			Standard	Existing	
County NN to County X	45 mph	45 mph	8-00	8-00	Yes
	60 mph	60 mph	4-15	4-08	Yes
	60 mph	60 mph	4-15	4-04	Yes
County X to Walnut Street	60 mph	45 mph	4-15	8-03	No
	60 mph	55 mph	4-15	4-47	No
	60 mph	50 mph	4-15	5-47	No
Walnut Street to County D	40 mph	35 mph	10-00	12-00	No
	40 mph	55 mph	10-00	2-00	Yes
	40 mph	50 mph	10-00	5-27	Yes
	30 mph	10 mph	19-00	168-31	No
	40 mph	55 mph	10-00	2-00	Yes
	40 mph	50 mph	10-00	6-00	Yes
County D to County DE/E	50 mph	45 mph	6-00	6-30	No
	50 mph	55 mph	6-00	3-24	Yes
	50 mph	45 mph	6-00	6-30	No
	50 mph	45 mph	6-00	7-00	No
County DE/E to US 18	50 mph	50 mph	6-00	5-30	Yes
US 18 to Hillside Drive	50 mph	55 mph	6-00	1-30	Yes
	50 mph	55 mph	6-00	2-00	Yes
	50 mph	55 mph	6-00	2-15	Yes
	50 mph	55 mph	6-00	3-00	Yes
	50 mph	50 mph	6-00	5-00	Yes
	50 mph	55 mph	6-00	0-45	Yes
Hillside Drive to County DR/Golf Road	40 mph	55 mph	10-00	1-30	Yes
	40 mph	55 mph	10-00	3-00	Yes
County DR/Golf Road to Meadow Lane	40 mph	50 mph	10-00	5-00	Yes
	50 mph	55 mph	6-00	2-58	Yes
Meadow Lane to WIS 16	50 mph	55 mph	6-00	1-00	Yes
	50 mph	55 mph	6-00	4-00	Yes
	50 mph	55 mph	6-00	4-00	Yes
	50 mph	55 mph	6-00	0-30	Yes
	50 mph	55 mph	6-00	0-30	Yes
	50 mph	50 mph	6-00	5-00	Yes
	50 mph	50 mph	6-00	5-00	Yes
	50 mph	55 mph	6-00	1-38	Yes
	40 mph	55 mph	10-00	1-30	Yes
WIS 16 to Chapel Ridge Road	40 mph	15 mph	10-00	38-12	No
	40 mph	30 mph	10-00	16-30	No
	40 mph	35 mph	10-00	12-00	No

The existing roadway follows the rolling terrain with numerous hills and valleys along the corridor. Whether a particular vertical curve (hill or valley) meets current design standards depends on the length of the curve and the difference in grades at each end of the curve. Design standards are set to provide a safe “stopping sight distance” which is the minimum distance required by a driver traveling at a given speed to bring the vehicle to a stop after sighting an object on the road. The vertical curve data is shown in Table 1-9.

There are 21 hills and valleys along the WIS 83 corridor that do not meet current design standards.

TABLE 1-9
Vertical Curves

Roadway Segment	Design Speed	Curve Type	Total Number Of Curves	Number of Curves that are	
				Adequate	Substandard
County NN to County X	60 mph	Sag	7	4	3
	60 mph	Crest	10	3	7
County X to Walnut Street	60 mph	Sag	4	0	4
	60 mph	Crest	4	0	4
Walnut Street to County D	40 mph	Sag	7	6	1
	40 mph	Crest	7	6	1
County D to County DE/E	50 mph	Sag	4	4	0
	50 mph	Crest	4	4	0
County DE/E to US 18	40 mph	Sag	4	4	0
	40 mph	Crest	2	2	0
	50 mph	Sag	2	1	1
	50 mph	Crest	2	2	0
US 18 to Hillside Drive	50 mph	Sag	4	4	0
	50 mph	Crest	4	4	0
Hillside Drive to County DR/Golf Road	40 mph	Sag	3	3	0
	40 mph	Crest	0	0	0
County DR/Golf Road to Meadow Lane	50 mph	Sag	1	1	0
	50 mph	Crest	1	1	0
Meadow Lane to WIS 16	50 mph	Sag	7	7	0
	50 mph	Crest	8	8	0
WIS 16 to Chapel Ridge Road	40 mph	Sag	0	0	0
	40 mph	Crest	2	2	0

There are also 7 locations where the existing roadway grade (percent slope) is steeper than recommended in WisDOT's design standards for rural and urban arterials in areas with rolling terrain. See Table 1-10.

TABLE 1-10
Substandard Grades on Existing WIS 83

Location	Design Speed and Roadway Type	Existing Grade (%) ¹	Recommended Maximum Grade (%)
County X to 600 feet (183 meters) north of County X	60 mph (100 km/h) Rural	+ 4.5	4.0
800 feet (244 meters) north of County X to 700 feet (213 meters) south of McFarlane Road	60 mph (100 km/h) Rural	-5.8	4.0
700 feet (213 meters) to 1,500 feet (457 meters) north of McFarlane Road	60 mph (100 km/h) Rural	-6.1	4.0
1,700 feet (518 meters) north of McFarlane Road to 600 feet (183 meters) south of Holiday Road	60 mph (100 km/h) Rural	+5.7	4.0
Fairfield Way to 600 feet (183 meters) north of Hillside Drive	35-45 mph (60 to 70 km/h) Rural to urban	-6.8 ²	8.0
Meadow Lane to 1,100 feet (335 meters) north of Meadow Lane	50 mph (80 km/h) Rural	+5.8	5.0
Nagawicka Road to County KE/Oakwood Road	50 mph (80 km/h) Rural	-7.0	5.0
Notes: 1. Grades are based on a northbound vehicle; plus grades indicate uphill and minus grades indicate downhill. 2. The Hillside Drive intersection is located on the downhill side of a vertical curve with a 6.8% grade. Current design practices recommend that at-grade intersections be much flatter than the allowable maximum grade values.			

Passing Opportunities

The extent of "no passing" segments on a roadway is a reflection of the vertical and horizontal alignment conditions and whether there are intersections. As indicated in Table 1-11, approximately 75 percent of the WIS 83 corridor has roadway characteristics that require no passing.

TABLE 1-11
Passing Opportunities

Roadway Segment	Length Miles (km)	Percent No Passing
County NN to County X	3.8 (6.0)	63
County X to Walnut Street	1.5 (2.4)	85
Walnut Street to County D	2.1 (3.4)	81
County D to County DE/E	1.1 (1.8)	64
County DE/E to US 18	1.7 (2.7)	74
US 18 to Hillside Drive	2.4 (3.8)	89
Hillside Drive to County DR/Golf Road	0.5 (0.8)	N/A ¹
County DR/Golf Road to Meadow Lane	1.1 (1.8)	N/A ¹
Meadow Lane to WIS 16	2.6 (4.2)	59
WIS 16 to Chapel Ridge Road	0.4 (0.6)	88
Notes: 1. Not applicable for percent no passing determination because segment is 4-lane divided.		

Intersections

Common deficiencies at intersections along the WIS 83 corridor include lack of turn lanes and tapers, sharp turning radii, and restricted visibility at some intersection vision corners.

Intersection sight distance is an important design factor in minimizing potential collisions between vehicles entering the WIS 83 traffic stream from the side roads and vehicles traveling through the intersections on WIS 83. A driver approaching an at-grade intersection should have an unobstructed view of the entire intersection and sufficient roadway length to control the vehicle. There are 9 locations along the WIS 83 corridor where intersection sight distance does not meet current design standards and is not sufficient for drivers to react to a vehicle entering the traffic stream from a side road. The diagram below illustrates a typical 4-legged intersection and its turning movements onto WIS 83. The turning movement designations "A" through "D" are used in Table 1-12 that lists the intersections with substandard sight distance.

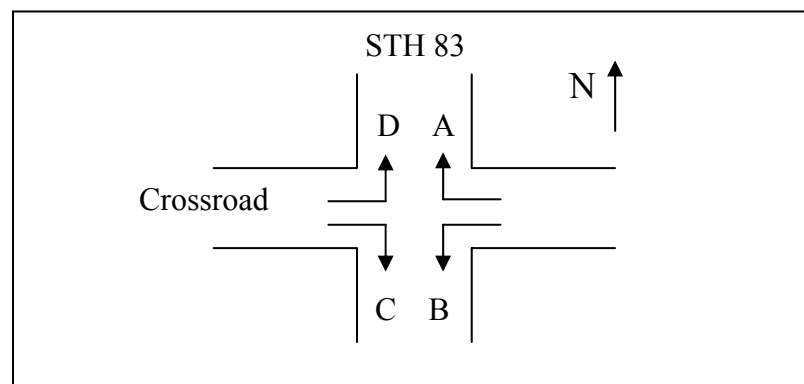


TABLE 1-12
Intersection Sight Distance at
Stop Sign Controlled Side Roads

Side Road Intersection With WIS 83	Design Speed	Sight Distance Along WIS 83 For Indicated Maneuver Feet (Meters)				Required Sight Distance ² Feet (Meters)
		A	B	C	D	
Sugden Road/Frog Alley	60 mph (100 km/h)	X ¹	600 (183)	X	X	1,150 (350)
County X	60 mph (100 km/h)	690 (210)	695 (212)	X	X	1,150 (350)
Holiday Road	60 mph (100 km/h)	X	720 (219)	X	X	1,150 (350)
County D	40 mph (65 km/h)	X	365 (111)	X	380 (116)	575 (175)
London Drive	50 mph (80 km/h)	580 (177)	X	X	X	840 (256)
County G	50 mph (80 km/h)	X	X	X	615 (187)	840 (256)
South Street	40 mph (65 km/h)	360 (110)	X	X	X	575 (175)
Scuppernong Valley Court	50 mph (80 km/h)	X	X	X	600 (183)	840 (256)
Nagawicka Road	50 mph (80 km/h)	X	X	X	615 (187)	840 (256)

Notes:

1. Table entries indicated with "X" indicate no sight distance problems for the associated maneuver.
2. Sight distances are measured to the right for left-turning vehicles and to the left for right-turning vehicles, Source: 1990 GDHS; Figures IX-40, Case IIIB and IIIC.

Intersection and approach sight distance is also important for at-grade trail crossings. The Lake Country Recreation Trail crosses WIS 83 at-grade just north of the signalized County DR/Golf Road intersection. Desired sight distance is 650 feet (198 meters) for a 40 mph (65 km/h) design speed and low speed trail use based on WisDOT guidelines. Actual sight distances do not meet the guidelines due to a high embankment on the west side and distances range from 300 feet (91 meters) to 550 feet (168 meters).

Intersection alignment is also a safety factor that needs to be considered in proposed roadway improvements. Side road intersections that meet the highway at a perpendicular angle (90 degrees) provide optimum safety conditions and sight distance. WisDOT's design standards specify a desirable intersection skew angle of 75 degrees or more and a minimum of 60 degrees. There are 3 intersections along the WIS 83 corridor that do meet the minimum design standard:

- The County X intersection has a skew angle of 28 degrees.
- The Seville Lane/Walnut Street intersection just south of WIS 59 has a skew angle of 57 degrees.
- The County D intersection has a skew angle of 55 degrees.

Access Points

Cross traffic and turning traffic combined with speed changes and lack of auxiliary lanes reduces operational efficiency, capacity, travel speed, and safety. The number of access points and the average density of access points per mile are important factors in potential conflicts between slower-moving vehicles, including farm machinery, entering and exiting the highway and faster-moving through traffic. As shown in Table 1-13, there are 318 access points from the project's south terminus near County NN to the north terminus at Chapel Ridge Road just north of WIS 16. The average number of access points per mile along the corridor is 19, nearly double the 10 per mile recommended in WisDOT's design guidelines.

TABLE 1-13
Access Point Summary

Roadway Segment	Length Miles (Km)	Field Entrances	Driveways	Public Streets	Other ¹	Total	Access Points per Mile (per Kilometer)
County NN to County X	3.8 (6.0)	3	40	7	0	50	13 (8)
County X to Walnut Street	1.5 (2.4)	0	10	4	0	14	9 (6)
Walnut Street to County D	2.1 (3.4)	1	72	10	0	83	40 (24)
County D to County DE/E	1.1 (1.8)	1	20	5	0	26	24 (14)
County DE/E to US 18	1.7 (2.7)	2	25	11	1	39	23 (14)
US 18 to Hillside Drive	2.4 (3.8)	5	15	14	0	34	14 (9)
Hillside Drive to County DR/Golf Road	0.5 (0.8)	0	0	12	0	12	24 (15)
County DR/Golf Road to Meadow Lane	1.1 (1.8)	1	6	2	2	11	10 (6)
Meadow Lane to WIS 16	2.6 (4.2)	8	23	10	0	41	16 (10)
WIS 16 to Chapel Ridge Road	0.4 (0.6)	1	3	4	0	8	20 (13)
Totals	17 (28)	22	214	79	3	318	19 (12) (average)
Notes: 1. "Other" includes the railroad and recreational trail crossings.							

Posted Speed and Design Speed

Posted speed limits and corresponding design speeds (see footnote 5 on page 1-13) along the WIS 83 corridor are listed in Table 1-14.

TABLE 1-14
Posted Speed and Corresponding Design Speed

Roadway Segment	Posted Speed mph (km/h)	Design Speed mph (km/h)
0.3 mile (0.5 km) north of County NN to 0.6 mile (1.0 km) north of County NN	40 (65)	45 (70)
0.6 mile (1.0 km) north of County NN to 0.2 mile (0.3 km) south of Walnut Street	55 (90)	60 (100)
0.2 mile (0.3 km) south of Walnut Street to 0.2 mile (0.3 km) south of WS railroad	35 (60)	40 (65)
0.2 mile (0.3 km) south of WS railroad to 0.1 mile (0.2 km) John's Way	25 (40)	30 (50)
0.1 mile (0.2 km) south of John's Way to 0.2 mile (0.3 km) north of County D	35 (60)	40 (65)
0.2 mile (0.3 km) north of County D to Welsh Road	45 (70)	50 (80)
Welsh Road to 0.1 mile (0.2 km) north of US 18	35 (60)	40 (65)
0.1 mile (0.2 km) north of US 18 to 0.1 mile (0.2 km) south of Hillside Drive	45 (70)	50 (80)
0.1 mile (0.2 km) south of Hillside Drive to 0.2 mile (0.3 km) north of County DR/Golf Road	35 (60)	40 (65)
0.2 mile (0.3 km) north of County DR/Golf Road to 0.1 mile (0.2 km) south of Capitol Drive	45 (70)	50 (80)
0.1 mile (0.2 km) south of Capitol Drive to 0.2 mile (0.3 km) west of Chapel Ridge Road	35 (60)	40 (65)

Railroad Crossings

There is an at-grade crossing of the WS railroad just west of Longacre Road in Genesee Depot. On average, 2 freight trains per day traveling at 25 mph (40 km/h) use the track. The crossing is protected with warning lights but no gates. The exposure factor at this crossing based on the average number of trains per day multiplied by the highway AADT in Design Year 2026 is 24,000. The exposure factor is well below the threshold of 100,000 that WisDOT uses for evaluating whether a grade-separating crossing is warranted in an urban area.

WIS 83 also passes over the Canadian Pacific (CP) railroad about 0.2 mile (0.3 km) south of Capitol Drive. On average, 30 freight trains per day traveling at 50 mph (80 km/h) use this track. There are also two Amtrak trains per day and the track is slated for a future high speed or commuter rail system. No exposure factor was calculated because the existing crossing is grade separated.

Safety

Highway safety is measured by the frequency and severity of crashes. An important objective of any transportation improvement is to minimize crash potential through roadway mainline and intersection design features and access management.

Roadway Mainline Crash Analysis

WisDOT maintains a database on crashes that have occurred annually on the state highway system⁷. That information is used to develop statewide average crash rates for urban and rural highways. Crash rates are expressed as crashes per 100 million vehicle miles traveled.

Table 1-15 summarizes crash data (excluding deer hits) on WIS 83 for the 4-year period 1997 through 2000.

⁷ WisDOT's database includes those crashes involving \$1,000 or more damage to any one vehicle, an injury or fatality, and \$200 or more damage to government property such as stop signs and guardrail.

TABLE 1-15
Roadway Mainline Crash Data

Year	Crash Severity			Totals
	Property Damage	Personal Injury	Fatality	
1997	55	69	0	124
1998	65	63	1	129
1999	79	70	1	150
2000	102	74	0	176
Totals	301	276	2	579

As shown in the table, a total of 579 crashes occurred along the WIS 83 corridor during 1997 through 2000. Crashes involving property damage accounted for 52 percent of the total and crashes resulting in personal injury accounted for 48 percent. The crash analysis showed that the highest category (57 percent) was rear end crashes; angle crashes ranked second (22 percent), and other unclassified crash types accounted for 21 percent.

Table 1-16 compares crash rates for the WIS 83 corridor to the statewide average rate for similar highways during 1997 through 2000. The WIS 83 crash rates and statewide crash rates presented in Table 1-16 represent an average for the 4-year period. Crash rates above the statewide average are shown in bold.

TABLE 1-16
Crash Rate Comparison

Roadway Segment	WIS 83 Crash Rate	Statewide Average Crash Rate
County NN to County X	151	116 ¹
County X to Walnut Street	88	116
Walnut Street to County D	425	300 ²
County D to County DE/E	153	116
County DE/E to US 18	253	116
US 18 to Hillside Drive	154	116
Hillside Drive to County DR/Golf Road	1,912	300
County DR/Golf Road to Meadow Lane	18	116
Meadow Lane to WIS 16	138	116
WIS 16 to Chapel Ridge Road	19	116
Notes: 1. The statewide average rate of 116 is for rural roadways. 2. The statewide average rate of 300 is for urban roadways.		

As shown in Table 1-16, all but three segments along WIS 83 had average crash rates higher than statewide average rates. Crash rates in the County DE/E to US 18 and Hillside Drive to County DR/Golf Road segments were substantially higher. The high crash rate can be attributed to lack of adequate turn lanes, short distance between decision points, and motorist inattentiveness.

Intersection Crash Analysis

Intersection crashes are defined as those recorded as occurring within 300 feet (91 meters) along each approach leg as measured from the center of the intersection. A crash analysis was conducted for 27 intersections along the WIS 83 corridor including the ramp terminals at I-94 and WIS 16. Crash rates were computed based on the number of crashes per one million vehicles entering the intersection and were compared to national average rates for signalized intersections (1.2) and unsignalized intersections (0.9).

The results of the analysis are presented in Table 1-17 where intersections that exceeded the national average rates are shown in bold.

As indicated in Table 1-17, six of the 27 intersections along WIS 83 had crash rates worse than the national average during 1997 through 2000.

TABLE 1-17
Intersection Crash Rates

Crossroad Intersection with WIS 83	Intersection Type	4-Year Average Crash Rate	National Average Crash Rate
Frog Alley / Sugden Road	Unsignalized	0.7	0.9
County I	Unsignalized	1.0	0.9
Road X	Unsignalized	0.2	0.9
County X	Unsignalized	0.7	0.9
WIS 59	Signalized	1.5	1.2
Depot Road	Unsignalized	1.5	0.9
County D	Unsignalized	0.4	0.9
County DE / E ¹	Unsignalized	0.4	0.9
County G	Unsignalized	0.5	0.9
Main Street	Unsignalized	0.5	0.9
Cymric Court	Unsignalized	0.4	0.9
US 18 / Summit Avenue	Signalized	1.0	1.2
Hillside Drive	Signalized	0.5	1.2
Heritage Drive ²	Signalized	2.4	1.2
Sun Valley Drive	Unsignalized	0.2	0.9
I-94 eastbound ramp terminals	Signalized	1.7	1.2
I-94 westbound ramp terminals	Signalized	1.6	1.2
County DR / Golf Road	Signalized	0.5	1.2
Mariner Drive	Unsignalized	0.1	0.9
County KE / Oakwood Road ³	Signalized	0.3	1.2
Walnut Ridge Drive (north)	Unsignalized	0.2	0.9
Walnut Ridge Drive (south)	Unsignalized	0.2	0.9
Cardinal Lane	Signalized	0.7	1.2
Capitol Drive	Unsignalized	0.9	0.9
WIS 16 eastbound ramp terminal	Unsignalized	0.2	0.9
WIS 16 westbound ramp terminal	Unsignalized	0.2	0.9
Notes: 1. Traffic signals were installed at the County DE/E intersection in 2001. 2. In fall 2001, dual southbound left turn lanes were added at the Heritage Drive intersection in an effort to reduce traffic conflicts and the number of crashes. 3. Traffic signals were installed at the County KE/Oakwood Road intersection in 1999.			

Environmental Aspects/Local Views

The Kettle Moraine area along the WIS 83 corridor has numerous environmental resources and aesthetic features including wetlands, woodlands, streams, environmental corridors, multi-use recreation trails, parks, historic structures/properties, rolling terrain, open space, and farmland. Preserving these resources to the extent possible and practical is an important purpose and need factor that needs to be considered when developing and evaluating the transportation improvement alternatives.

For projects affecting resources protected under the Clean Water Act, the project's purpose and need and reasonable alternatives must consider the *Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material* administered by the U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers. The guidelines state that dredged or fill material should not be discharged into aquatic ecosystems including wetlands, unless it can be demonstrated that there are no practicable alternatives, that such discharge will not have unacceptable adverse impacts, and that all practical measures to minimize adverse effects are undertaken.

Input on purpose and need provided by representatives on the Project Advisory Committee (PAC) and area residents indicates general agreement that improvements to WIS 83 are needed to address increasing traffic and safety concerns. With that support however, there is a strong desire to preserve the natural rural beauty of the highway corridor and the "small town" character of the communities through which it passes. There is also a strong desire to incorporate a multi-use recreation path along WIS 83 segments that have bicycle use today and where there is the potential for providing bicycle/pedestrian connections to adjacent trail systems.

Corridor Preservation

Corridor preservation is a coordinated application of measures to protect right-of-way for a planned long-term transportation improvement project. It can be viewed as a positive step toward precluding the possibility of an improvement alternative that would disrupt established and planned community development patterns. If a Build Alternative is selected, the WIS 83 corridor study will provide functional plans that local governments can use as a blueprint for making land use and development decisions, and for preserving the land needed for future transportation improvements.

Some of the key benefits of corridor preservation are summarized as follows:

- **For local governments** – Early coordination between WisDOT and municipalities along the WIS 83 corridor can result in better land use, transportation, and development planning. In particular, where the highway right-of-way is relatively narrow, it is important to preserve adjacent land for future highway improvements if needed.

- **For business/other development interests**—Investments can be made with some assurance that highway infrastructure will be available to provide safe and efficient service, and that business development will be compatible with the design features of future highway improvements. Commercial, residential, and industrial developers will have confidence in the location of the recommended alternative, and they can work with local governments and WisDOT regarding site plans and access.
- **For area residents**—Homebuyers and residents will be spared the uncertainty of whether their properties will be affected by future highway improvements, and cooperation between property owners, local governments, and WisDOT will afford opportunities for early right-of-way acquisition and residential relocations.
- **For WisDOT**—Critical parts of the right-of-way needed to construct the highway improvements will be “tied down,” saving time and money in implementing both interim and long term improvements.
- **For the traveling public**—The traveling public benefits to the extent that corridor preservation facilitates orderly and timely delivery of the transportation improvements.
- **For the environment**—Early identification of environmental resources and alternatives that avoid or minimize adverse effects, as well as the lead time to construction, offers an opportunity for planning and implementing preservation, mitigation, and enhancement strategies to protect critical resources along the highway corridor.

Corridor preservation can be carried out in some of the following ways:

- **Corridor preservation mapping**—Local governments and WisDOT can work together to map the land needed for future transportation improvements (Section 84.295, *Wisconsin Statutes*), or local governments can incorporate proposed transportation improvements into their adopted land use maps. Such mapping would be used to inform the public and potential developers about land that has been preserved for future transportation improvements and would prevent costly development from taking place too close to the future right-of-way.
- **Access management guidelines**—WisDOT and local governments can develop access control guidelines that specify how access to adjacent land will be provided while simultaneously preserving traffic flow, capacity, and safety on WIS 83 and its intersecting local roads.
- **Administrative access control**—Under Section 84.25, *Wisconsin Statutes*, WisDOT can designate controlled-access highways on which present access is “frozen” with future alterations requiring WisDOT approval.
- **Purchase access control**—Under Section 84.09, *Wisconsin Statutes*, WisDOT can purchase access rights to alter or eliminate unsafe access points or to restrict or prohibit additional access.
- **Subdivision plat review**—Under Chapter 236, *Wisconsin Statutes* and *Wisconsin Administrative Code* Chapter TRANS 233, WisDOT reviews proposed subdivision plats to ensure they comply with access management goals.

- **Driveway permits** – Under Section 86.07, *Wisconsin Statutes* and *Wisconsin Administrative Code* Chapter TRANS 231, WisDOT has the authority to issue permits for new driveways or to remove driveways constructed without a permit.
- **Provide input to local land use planning efforts** – Transportation impact analyses for proposed development are reviewed by WisDOT in consultation with local governments to ensure consistency with access management goals and guidelines.
- **Subdivision control and development ordinances** – Local governments can require developers to preserve environmental resources, reserve property for future transportation improvements, provide buffers and other amenities, and to construct internal circulation roads and driveways in a manner that minimizes direct access to WIS 83.
- **Advanced property acquisition** – WisDOT can develop a real estate acquisition and relocation plan that allows purchasing properties as they become available prior to constructing the transportation improvements.

SUMMARY

The purpose of the proposed action is to provide a safe and efficient transportation system in the WIS 83 corridor to serve present and long-term traffic demand while minimizing disturbance to the natural and built environment. The proposed transportation improvements have the following objectives: Address traffic demand, existing highway deficiencies, safety concerns and access management, preserve environmental resources, and provide a blueprint that can be used by local governments in making future land use and development decisions that include preserving land for future transportation improvements.

The need for transportation improvements is based on the factors summarized below.

Transportation and Land Use Planning

Regional Land Use Plan

The adopted *2020 Regional Land Use Plan* was designed for an *intermediate* growth scenario in the region including Waukesha County. The majority of the WIS 83 corridor is envisioned as having a mix of low to medium density and suburban residential development as well as maintaining large tracts of open space, farmland, rural density residential development, and primary environmental corridors.

Regional Transportation System Plan

The *2020 Regional Transportation System Plan* recommendations for the WIS 83 corridor are summarized as follows:

- Provide additional capacity (4-lane facility) from Mukwonago near County NN to WIS 59
- No additional capacity needed from WIS 59 to County DE/E

For purposes of the WIS 83 Corridor Study, this gap has been refined to also include the portion of WIS 83 between County X and WIS 59 because forecast traffic volumes for Design Year 2026 do not indicate the need for additional capacity in this segment.

- Provide additional capacity (4-lane facility) from County DE/E to WIS 16

Transportation Improvement Program (TIP)

The *Transportation Improvement Program for Southeastern Wisconsin: 2002-2004* (SEWRPC, February, 2002) includes the following entries for the WIS 83 corridor (listed from south to north):

- Project #502: Reconstruction with no additional lanes from County NN to WIS 59
- Project #501: Resurface from WIS 59 to Genesee Depot and from County D to County DE
- Project #514: Reconstruct with additional lanes from US 18 to I-94
- Project #512: Reconstruction with additional lanes from Mariner Drive (near I-94) to WIS 16

Project #502 and Project #501 are interim Highway Preservation (HP) improvements intended to preserve the functionality of the existing roadway until capacity improvements are made at some point in the future as recommended in the Regional Transportation System Plan.

To provide flexibility in the range of alternatives being considered in the WIS 83 Corridor Study, the 2002-2004 TIP was amended on March 28, 2003 to include the corridor study from the Village of Mukwonago to STH 16 (TIP Project #856).

Waukesha County Development Plan

Prior to the 2020 *Regional Transportation System Plan*, Waukesha County in consultation with SEWRPC, conducted a comprehensive “growth management” planning effort to guide the county and its municipalities in joint decision-making regarding future development. The *Development Plan for Waukesha County* (SEWRPC Community Assistance Planning Report 209, August, 1996) envisions that urban land use in the county will increase in the future by about 72 percent under “buildout” conditions (full development of areas proposed for urban land uses). In its transportation recommendations, the Waukesha County development plan notes that the WIS 83 corridor would need to be a 4-lane facility in its entirety to accommodate future buildout development.

System Linkage and Route Importance

WIS 83 is functionally classified as a “minor arterial” intended to provide moderate through traffic mobility and to funnel traffic from local roads and traffic generators to higher-type highways. As a north-south arterial highway, WIS 83 serves as the main stem for a network of east-west roadways that collect and distribute traffic in the area between WIS 67 to the west and WIS 164 to the east.

WIS 83 is an “access management” corridor under WisDOT’s *Statewide Access Management Plan* intended to maintain high mobility for through traffic while providing reasonable local road and property access, enhance and preserve traffic flow and carrying capacity, and to improve safety on rural highways and those transitioning from rural to urban/suburban service characteristics.

Existing and Future Traffic

Existing traffic volumes along the WIS 83 corridor range from 6,900 AADT in the County X to County DE/E segment to 23,200 in the Hillside Drive to County DR/Golf Road segment. Traffic in the entire corridor is expected to increase between 53 and 64 percent by Design Year 2026.

For minor arterials like WIS 83, WisDOT considers Level of Service (LOS) “D”, with moderate congestion, to be an acceptable threshold for increasing capacity. Under today’s traffic, two segments, County DE/E to Hillside Drive and Meadow Lane to WIS 16, are below the LOS “D” threshold. In 2026, four segments, County NN to County X, County DE/E to Hillside Drive, Hillside Drive to County DR/Golf Road, and Meadow Lane to WIS 16, would fall below the threshold if no improvements were made.

Approximately 6 percent of the total traffic on WIS 83 is comprised of trucks. Under today’s traffic volumes, the number of trucks that use the corridor on an average weekday ranges from 420 in the lowest volume segment to 1,400 in the highest volume segment. In 2026, daily truck

traffic is expected to range from 700 to 2,200. The number of trucks in the traffic stream affects traffic operations and safety, and contributes to the level of congestion.

Under present traffic conditions, all of the major signalized intersections are operating at an acceptable LOS except the Cardinal Lane intersection that is below the LOS “D” threshold due to the heavy westbound left turn volume during the evening peak period. Increased user delays can be expected in 2026 for all the intersections if no improvements are made.

Existing Highway Deficiencies

Existing WIS 83 has 11 locations where horizontal curves do not meet current design standards and there are 21 hills and valleys that do not meet current design standards for stopping sight distance. There are also 7 locations where the existing roadway grade (percent slope) is steeper than recommended in WisDOT’s design standards for rural and urban arterials in areas with rolling terrain and applicable design speeds. Approximately 75 percent of the WIS 83 corridor has roadway characteristics that require no passing.

There are 318 access points from the project’s south terminus near County NN to the north terminus near Chapel Ridge Road just north of WIS 16. The average number of access points per mile along the corridor is 19, nearly double the 10 per mile recommended in WisDOT’s design guidelines. Cross traffic and turning traffic combined with speed changes and lack of auxiliary lanes reduces operational efficiency, capacity, travel speed, and safety. The number of access points and the average density of access points per mile are also important factors in potential conflicts between slower-moving vehicles, including farm machinery, entering and exiting the highway and faster-moving through traffic.

Safety

A total of 579 crashes occurred along the WIS 83 corridor during 1997 through 2000. Crashes involving property damage accounted for 52 percent of the total and crashes resulting in personal injury accounted for 48 percent. The crash analysis showed that the highest category (57 percent) was rear end crashes; angle crashes ranked second (22 percent), and other unclassified crash types accounted for 21 percent.

All but three segments along WIS 83 had average crash rates higher than statewide average rates. Crash rates in the County DE/E to US 18 and Hillside Drive to County DR/Golf Road segments were substantially higher. The high crash rates in the WIS 83 corridor can be attributed to the lack of adequate turn lanes, short distance between decision points, and motorist inattentiveness. Six of the 27 intersections along WIS 83 had crash rates worse than the national average during 1997 through 2000.

Environmental Aspects/Local Views

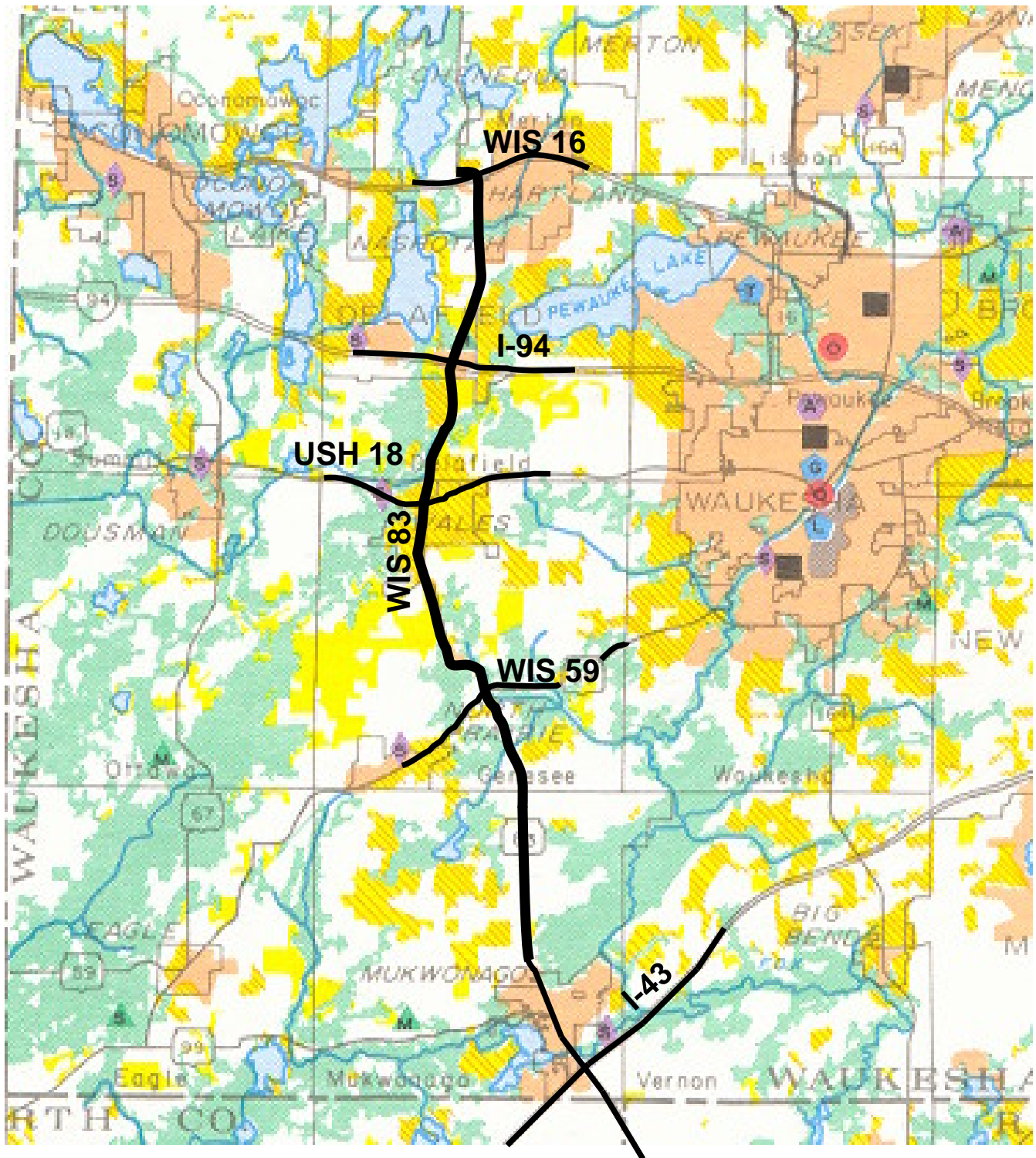
The WIS 83 corridor has numerous environmental resources and aesthetic features including wetlands, woodlands, streams, environmental corridors, multi-use recreation trails, parks, historic structures/properties, rolling terrain, open space, and farmland. Preserving these resources to the extent possible and practical is an important purpose and need factor that needs to be considered when developing and evaluating the transportation improvement alternatives.

For projects affecting resources protected under the Clean Water Act, the project's purpose and need and reasonable alternatives must consider the *Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material* administered by the U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers. The guidelines state that dredged or fill material should not be discharged into aquatic ecosystems including wetlands, unless it can be demonstrated that there are no practicable alternatives, that such discharge will not have unacceptable adverse impacts, and that all practical measures to minimize adverse effects are undertaken.

Input on purpose and need provided by representatives on the project's Advisory Committee and area residents indicates general agreement that improvements to WIS 83 are needed to address increasing traffic and safety concerns. With that support however, there is a strong desire to preserve the natural rural beauty of the highway corridor and the "small town" character of the communities through which it passes. There is also a strong desire to incorporate a multi-use recreation path along WIS 83 segments that have bicycle use today and where there is the potential for providing bicycle/pedestrian connections to adjacent trail systems.

Corridor Preservation

Corridor preservation is a coordinated application of measures to protect right-of-way for a planned long-term transportation improvement project. It can be viewed as a positive step toward precluding the possibility of an improvement alternative that would disrupt established and planned community development patterns. If a Build Alternative is selected, the WIS 83 corridor study will provide functional plans that local governments can use as a blueprint for making land use and development decisions, and for preserving the land needed for future transportation improvements.



LEGEND








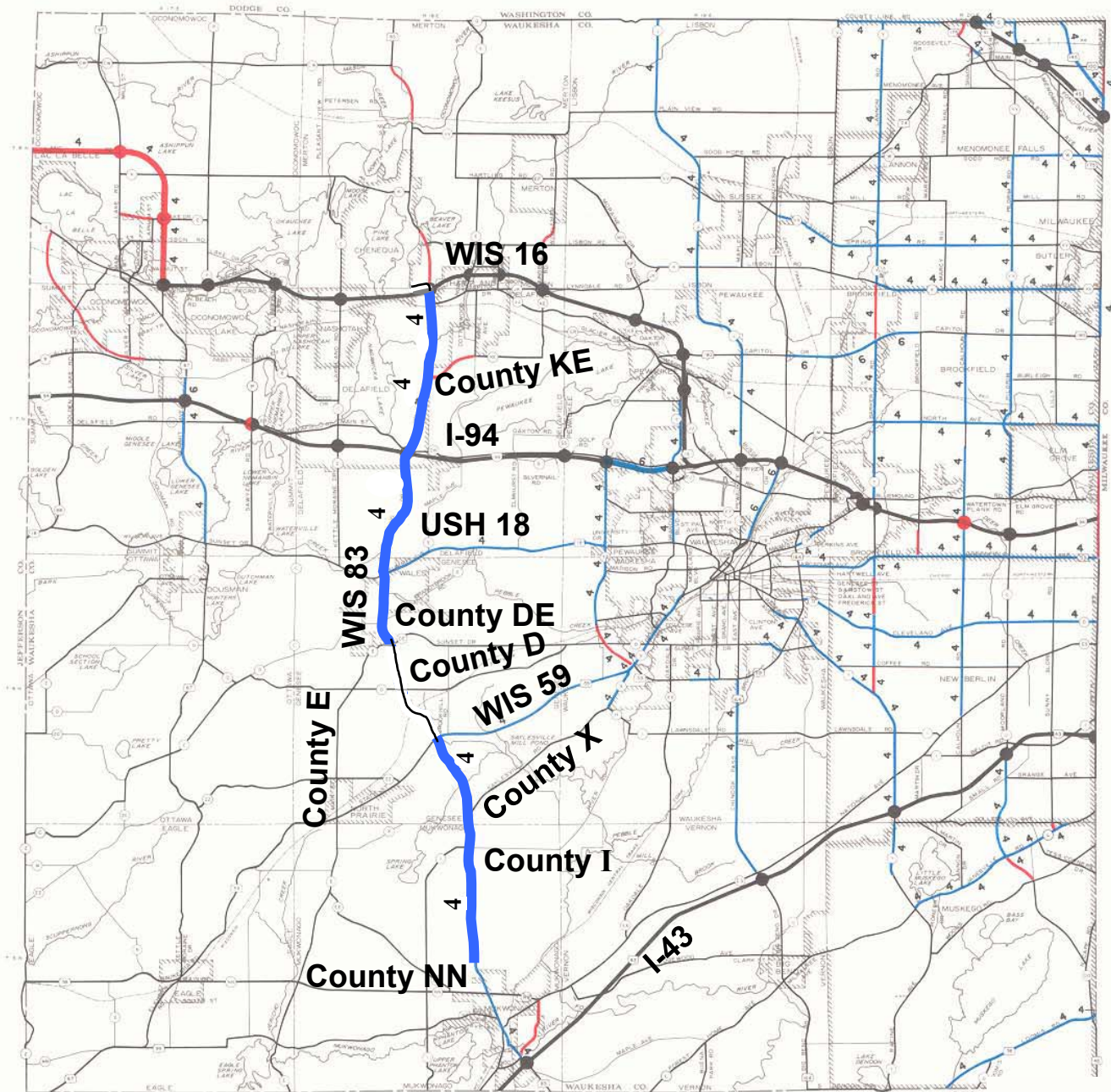
	SUBURBAN RESIDENTIAL (0.2-0.6 DWELLING UNITS PER NET RESIDENTIAL ACRE)
	LOW DENSITY RESIDENTIAL (0.7-2.2 DWELLING UNITS PER NET RESIDENTIAL ACRE)
	MEDIUM DENSITY RESIDENTIAL (2.3-6.9 DWELLING UNITS PER NET RESIDENTIAL ACRE)
	HIGH DENSITY RESIDENTIAL (7.0-17.9 DWELLING UNITS PER NET RESIDENTIAL ACRE)
	PRIMARY ENVIRONMENTAL CORRIDOR
	AGRICULTURAL AND RURAL- DENSITY RESIDENTIAL LAND
	WATER



Exhibit 1-1
2020 Regional Land Use Plan
Waukesha County

Source: SEWRPC

**FUNCTIONAL IMPROVEMENTS TO THE ARTERIAL STREET AND HIGHWAY SYSTEM IN
WAUKESHA COUNTY: 2020 FINAL RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN**



Under the final recommended regional transportation system plan, the arterial street and highway system in Waukesha County would be expanded by 59 miles, or 8 percent, from 718 miles in 1995 to 777 miles in the year 2020. The increase in arterial mileage would come about through the construction of 21 miles of new facilities and through the conversion of 38 miles of previously nonarterial facilities to arterial status in order to accommodate expected traffic volumes and to provide the arterial spacing necessary to properly structure planned urban development. The plan would provide for the construction of 21 miles of new arterial facilities, for the widening of 142 miles, and for the preservation of 614 miles of facilities within the County.

Source: SEWRPC.

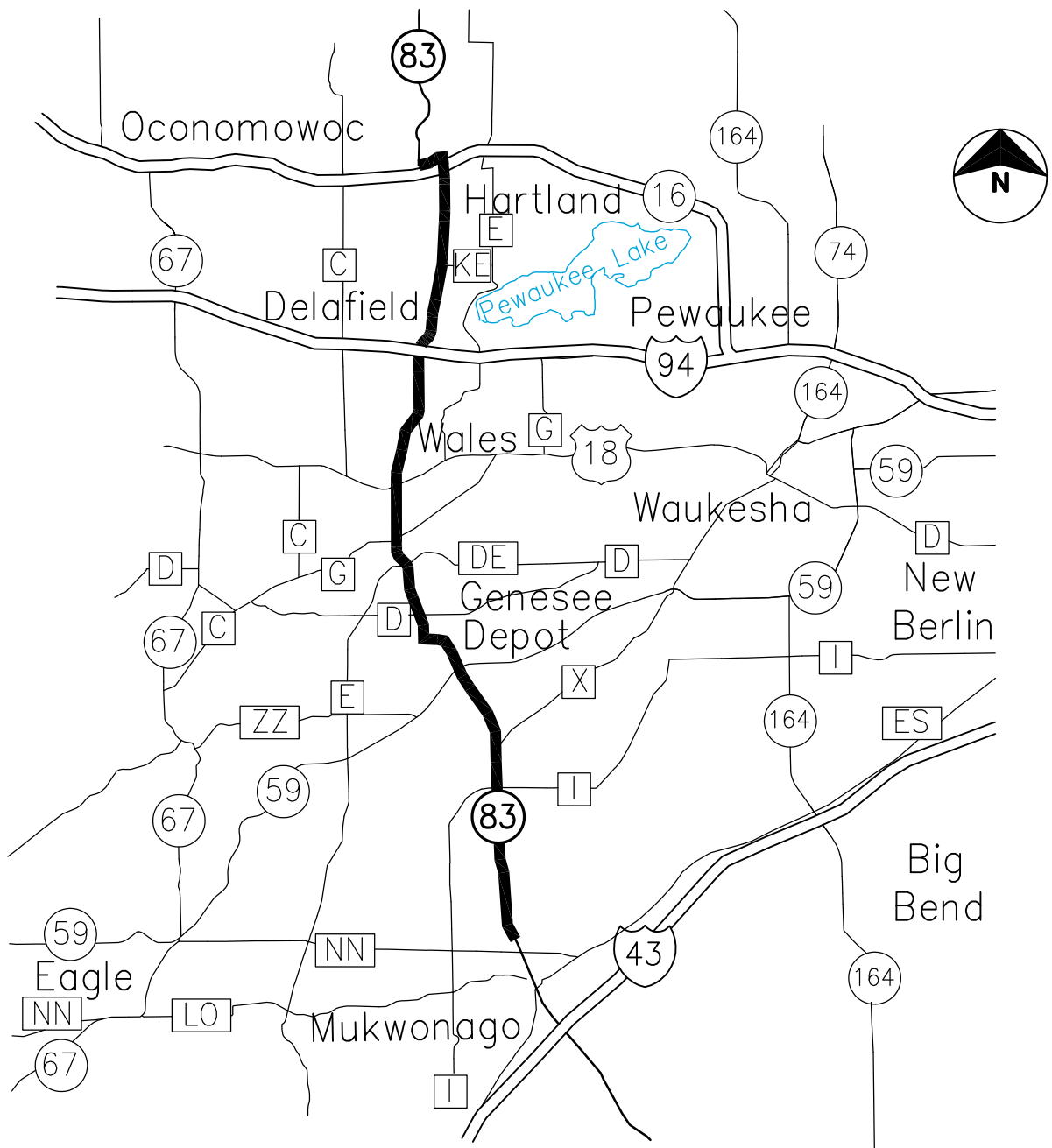
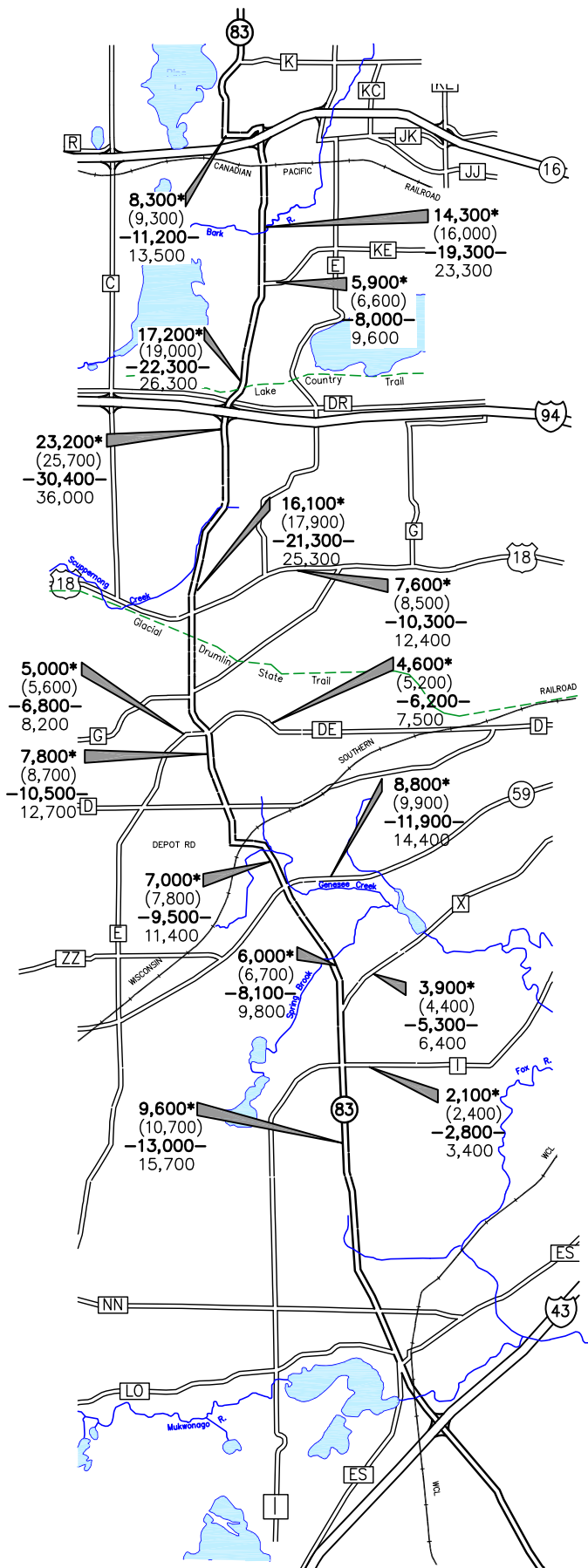


Exhibit 1-3
WIS 83 System Linkage



Legend

0,000*	2000 AADT (Annual Average Daily Traffic)
(0,000)	2006 AADT
-0,000-	2016 AADT
0,000	2026 AADT

Exhibit 1-4
Existing and Forecasted
Traffic Volumes



Narrow shoulders south of WIS 59
Looking north



90-degree turn in Genesee Depot
Looking east



Steep grades south of County KE
Looking north



Substandard intersection sight distance at Criglas Road
Looking south



Traffic congestion at US 18
Looking northeast



Lack of turn lanes at Sugden Road
Looking north